

Life beyond load-shedding

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Electricity is the biggest single constraint on the South African economy. It also demoralises citizens and saps the energy of individuals and corporates, big and small alike. Load-shedding, fights about coal, the odours hanging over Karpowership, the bickering among some ministers and with Eskom management are all destabilising, leaving South Africans perplexed and frustrated.

All this noise obscures a different trend line that has been taking shape over the past few years.

The fall and rise of renewable energy

Let's cast our minds back. South Africa's highly successful Independent Power Producer Programme (IPP), launched in 2011, was brought to a screeching halt in 2015 by the Eskom CEO at the time, Brian Molefe, when he refused to sign 27 approved IPP contracts. Not only were already-built solar plants not commissioned, but the flow of investment was arrested and industrialisation benefits from developing a solar industry were buried. The stagnation lasted three years.

Then in 2018, seven weeks after Cyril Ramaphosa became president, the 27 contracts were signed, unleashing some R56 billion in investment. It didn't happen without opposition. Coal interests were livid. They blockaded Tshwane more than once and went all the way to the Appeal Court in Bloemfontein to get an interdict to stop the signing of the contracts. Even so, the investments went ahead. The last of those IPPs have been connected to the grid this year.

The signing of the contracts was an early political signal of what we could expect from the Ramaphosa government on energy matters. This signal was reinforced by the Integrated Resource Plan (IRP) and the Eskom road map of October 2019. Everything that is unfolding now, was spelt out then.

Expanding the supply of renewables is now an irrevocable part of government policy. Bid window 5 for 2 600 MW of renewable energy was successfully concluded this year, unlocking R50 billion in investment. In January 2022 bid window 6 for another 2 600 MW of renewables will open. The IRP provides for a further 15 000 MW of renewables to be added to the grid in the nine years to 2030.

Eskom is scheduled to decommission 10 000 MW of coal-fired generation by 2030 and considerably more after that. Eskom itself, and with it, South Africa as a whole, is making a decisive shift from coal to renewable and other technologies.

To be clear, South Africa will still use coal for many decades to come. Medupi and Kusile devour coal. Their life cycle is probably 40 years or more. Many of the other coal power stations will also be with us for a while. It is unrealistic to think we will see a dead stop on coal soon. Even so, the shift to renewables is happening.

(The regulatory system is cumbersome and too slow for the country's needs. It will have to change in fundamental ways, but that requires a separate note. Here we deal with what is actually happening, not what should happen.)

Risk mitigation: a tale of two technologies

The one blot on a generally favourable trend is the Karpowership component of the risk mitigation programme. Karpowership was allocated 1 350 MW of this programme, and renewables 650 MW. The Karpowership contract is mired in controversy and legal challenges. Whether it will go ahead remains to be seen. In this note we exclude it from

all numbers.

The renewable contracts, on the other hand, are forging ahead. Producers must supply power from 05h00 until 21h30. Obviously, the sun doesn't shine for all those hours, so they must invest in storage technology. In Kenhardt, solar panels and batteries are being installed by a Norwegian company; and in Postmasburg a Saudi-Arabian company installed salt technology. The latter has been supplying power for 24 hours of the day for a year now. Solar and storage can help address the base load issue. Investment is expected at around R29 billion.

Municipalities

Two other important political decisions have been taken since 2018. One was to allow municipalities to procure their own power. Johannesburg Metro was first out of the blocks and is finalising procurement for 220 MW from wind, solar and gas, among others using the roof tops of municipal buildings. The expected investment will be R3,8 billion – all of which is private capital. Eight other municipalities, including Cape Town and eThekweni, are engaged in similar initiatives but are not as far advanced as Joburg. Apart from alleviating load-shedding, it will unlock significant private sector investment.

100 MW, wheeling and dealing

The second crucial decision came in June. It was actually a three-in-one decision. The exemption from acquiring a National Energy Regulator of South Africa (Nersa) license for generation was lifted from 1 MW to 100 MW, companies are allowed to 'wheel' their 'own-generated' power on the Eskom grid at a fee (the wheeling), and they can sell it to third parties (the dealing). This led to high expectations and much excitement, but to date no projects have been registered yet.

Part of the reason lies in the complicated nature of the registration process. It is easier to do than to get a licence, but existing laws must still be adhered to. These include environment laws, water and land use regulations, building plan approvals and adherence to municipal bylaws. The Minerals Council has compiled a list of 16 such requirements, involving seven different authorities from municipalities to national departments to Nersa and agreeing the fee for wheeling with Eskom. Simple it ain't.

Given load-shedding, one can understand the frustration of people who want to generate power immediately and must now jump through hoops, but one can also understand that the laws of the land must be obeyed. (Again, my earlier point about revamping the entire system.)

Despite these difficulties, the projects will be executed simply because the benefits are so overwhelming (cost, energy security, carbon taxes, and **environmental, social and governance** - ESG - requirements). The Minerals Council has announced that its members are working on installing 3 900 MW at an estimated investment of R60 billion. Data from other industries are not as clear, but a leading real estate investment trust, for example, estimates that it can meet 50% of its power needs from solar and batteries. They are also upset about the regulatory process, but are proceeding nonetheless, "aggressively" in the words of the CEO. It is noticeable how many companies are now reporting on installing renewable power.

Investment bonanza

Using current investment numbers, the known activities outlined above can harness R420 billion in investment over the next five to six years. More projects will mean higher investment, all provided by the private sector. The number of R420 billion is only for generation.

Then one must add investment for upgrading of the grid (R178 billion) and distribution systems (R30 billion). Money

from the COP26 agreement will help to pay for that.

The new IRP, likely to come in 2022, will certainly increase the numbers from the 2019 IRP, which will facilitate more megawatts and rands. Add it all together and R1 trillion rand over the next decade and a half is not far-fetched. These investments also open the door to local manufacturing and services, spurring activity in the same way the discovery of gold did – it formed the basis for South Africa's industrialisation between the 1920s and early 1980s.

How long will load-shedding be with us?

Here the critical issue is the Energy Availability Factor (EAF) – the percentage of maximum possible contribution to the grid that plants are actually delivering. In the last financial year it was 64%. The target for this financial year was 70%. However, for the year to the end of October it ran at 63%, reaching a low of 56% in November.

The Eskom stations, excluding Medupi and Kusile, are on average 41 years old and have been poorly maintained. Part of the reason for the low EAF is a stringent maintenance programme to make up for many years of neglect. Eskom has indicated that it plans to complete this programme by September 2022, and that performance will improve after that. We will see.

A further reality is that Medupi and Kusile, which were supposed to take us to a new level of available capacity, have design flaws. The towers were too short and had to be lengthened, causing each unit to be taken out of production for 75 days at a time.

Then of course Murphy's Law also operates. An accident at Medupi in August put one unit out of action for two years. Eskom now projects that Medupi will be fully operational only in August 2023 and Kusile in 2024.

As if this is not enough, recently revealed evidence points to deliberate sabotage.

The bottom line is that most of Eskom's plant is old and poorly maintained and the new plants are poorly built. Eskom's five-year forecast presents two scenarios: 63% and 66% EAF for the next five years. At 63% EAF, 5 000 MW new baseload capacity must be installed in five years; at 66%, 2 500 MW will suffice. Either way, we need new capacity. As outlined above, that is in process, but it will take time.

So what?

- While we were mired in the noise of load-shedding and odours of Karpowership, a significant trend has emerged. South Africa has pivoted to a completely different energy dispensation. It's not only about renewables and coal, but also about ending the Eskom monopoly and developing a market for electricity.
- Changing the entire electricity industry and structure is a necessary but difficult process, much like the proverbial 'servicing an aircraft while it is flying'. Frustrations and missteps will happen as the country transitions, but the trajectory is crystal clear.
- Load-shedding will be with us at least until September 2022 and maybe longer, depending on how quickly new capacity comes online.
- Energy is certainly the big new investment frontier in South Africa, with many investors queueing to submit very competitive bids.
- South Africa's biggest constraint, electricity, is also shaping up as its biggest opportunity. And that is before we start talking about hydrogen, on which I will do a note in the new year.

I wish you a happy festive season.